Preparing international students for university: Mathematics as part of an integrated program

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Introduction

All students need some level of mathematics understanding for tertiary academic study (academic numeracy) and yet many preparatory and foundation programs for international students either include mathematics courses based on a school curriculum, or no mathematics at all. For the past fifteen years the University of Southern Queensland (USQ) has provided a process-based preparatory program, including a course in academic numeracy, specifically developed for international students who have been accepted into a degree program conditional on successful completion of this program. The program has recently been evaluated and a more integrated approach has been taken adapting more recent theories of transfer and situated cognition (e.g. Evans, 1999; Kemp, 1995).

To enter university, students are expected to have a suitable overall academic tertiary entrance score. However, the number of specific prerequisites for university courses has declined in the last decade. The only specified prerequisite that seems to have survived is English and for international students a specified level such as International English Language Testing System 6 (IELTS 6). This is not to say that universities' expectations have declined, rather there is a general expectation that if students wish to enrol in certain courses they will have gained appropriate skills via any number of avenues. While it may be obvious that students need a certain level of mathematics to gain entry into Engineering, this is not so clear in other degrees such as Business, Nursing, or even Arts. The mathematics issue becomes more difficult when students are from other countries as there are curriculum differences. For example some students have no experience with using a calculator, others may have excellent algebraic skills but few graphing skills and little experience with any statistics. Moreover, when a university program suggests no mathematics prerequisites they do not mean no academic numeracy skills. For example when business lecturers were asked their perceptions of students' knowledge, they expected them to have, among others, basic algebraic and graphing skills (Taylor, Galligan & Van Vuuren, 1998). Students

are also expected to know how to use a scientific calculator in many business and other courses. This expectation is not so evident for the student. By not clarifying university expectations, confusion and under preparedness may result. The danger is that mathematics, or more correctly appropriate academic numeracy skills, becomes undervalued. In preparatory programs this can be overcome. One way to overcome this is to make the mathematics relevant and embedded and to ensure that all involved in the program are aware of the students' needs including academic numeracy needs.

Students' graduate attributes also reflect many student academic numeracy needs either explicitly or implicitly. For example the *Graduate Skills Assessment Test* (ACER, 2003) include four generic skills of problem solving, critical thinking, interpersonal understandings and written communication. Of the examples given by ACER, three of the four skills involve some numeracy. Moreover the need for numeracy sits alongside other attributes of academic literacy as well as generic or transferable skills. Flemming (1998) goes further and suggests that, 'Higher Education is ultimately and inescapably about developing metacompetence [i.e. the versatility to deal with a variety of different problems by being able to draw on appropriate skills and knowledge to the circumstance] than it is about anything else' (p. 10).

These graduate attributes apply equally to international students and are fostered in students from first year and hence need to be flagged in preparatory programs. While it is often the lack of academic English skills of these students that is highlighted, in reality other issues underlie this and are simply manifested in students' writing.

To improve international students' graduate attributes, universities must prepare students adequately. Recent research has suggested that it is a solid start to university which assists a lower drop out rate and higher results (Lang, 2002). Many Australian universities have foundation programs for international students, which often consist of content-based courses with a strong element of English language development. However many students need more than this, especially if they come from different education systems. Academic culture (Ballard & Clanchy, 1991), critical thinking (Robertson, Line, Jones & Thomas, 2000) and problem solving skills (Dale & Cuevas, 1987) of western universities are but some of the extra aspects that need to be incorporated into such courses.

The UNIPREP program that is the subject of this paper is designed to have four integrated courses: *Studying at University*, *Communication Processes*, *English for Academic Purposes*, and *Mathematics Communication*. This article will outline the *Mathematics Communication* course and show how it is integrated with the other courses in the program emphasising the importance of transfer of knowledge, rich language tasks and application of academic skills in the course. As the curriculum in mathematics in schools recognises the importance of communication in the mathematics classroom (see, for example, the collection of articles edited by Stephens et al. (1993) on communicating mathematics), this approach has importance not only for second language learners but also for students and teachers in the high school mathematics classroom as it provides an example of how language can be intimately incor-

porated into a mathematics classroom and also how mathematics can be appreciated by those outside the mathematics classroom.

Background

Since 1989, USQ has run a thirteen-week 'UNIPREP' program which consists of courses in *Studying at University*, *English For Academic Purposes*, *Communication Processes*, and *Mathematics Communication*. The program has produced many students who are as successful in their degree studies as their counterparts who gained direct entry.

The course *Mathematics Communication* is student-centred with a strong emphasis on reading, writing, listening and speaking about mathematics using a self-paced mastery model for the development or revision of mathematics skills in English, and a problem-based group approach for learning and appreciating academic numeracy (Galligan, 1992). Using a problem solving approach to assist non-English speaking background (NESB) students is not new (Crandall, 1987; Cuevas, 1984; Hubbard, 1994; Kessler, 1987), but we wished to go further by directly linking the mathematics course to the other courses in the program. The overall aims of the *Mathematics Communication* course are: to revise and develop students' mathematical knowledge and skills; to help students practice and develop language and problem solving skills in English; and to provide opportunities for students to express themselves in English in a mathematical context in both oral and written format. Moreover, the course introduces students to approaches to teaching and learning that they may not have experienced such as problem solving, group work and questioning by students. Many Australian students are familiar with these from school and many lecturers expect students to be familiar with these approaches. In order to enhance students' opportunities, skills taught in the other courses are practiced in the mathematics course. To fulfil these aims, the course is broken into two parts. Part A (four hours per week) is based on a problem solving approach and language skills of reading, writing, speaking, and listening are actively practised. Part B (up to three hours per week and self-paced) develops and revises mathematics skills needed for students' particular degrees, in the medium of English.

The other courses are as follows:

- *Studying at University* (SAU) introduces students to university level study and learning skills and to student-life skills. It is a comprehensive guide to developing effective study strategies vital to successful completion of a tertiary level program.
- *English for Academic Purposes* (EAP) develops: reading skills by processing a range of texts typical of undergraduate reading styles; academic expository writing skills; and listening and speaking skills in participating in tutorial presentations at first year university level.
- *Communication Processes* (CP) focusses on strategies basic to independent assignment writing habits as well as performance strategies in communication skills expected by higher education institutions in Australia.

In order to assist students to transfer their knowledge and skills, elements of each course are deliberately linked to other courses so students must refer to other courses to complete reports, present orals, participate in class effectively, read articles quickly etc. Success of the program depends on teachers' understanding of all courses so aspects of other courses can be utilised as the need arises. There are specific elements of the course that are deliberately linked to make this more explicit. This will be described in three areas:

- elements of the other courses used in the *Mathematics Communication* course;
- elements of the *Mathematics Communication* course used in other courses; and
- assessment.

Table 1 below summarises the some of the main skills taught in UNIPREP and how these skills are then utilised in other courses.

Table 1. Skills taught and utilised in UNIPREP.

Skills	MC	EAP	CP	SAU
Developing language (vocabulary, grammar etc.)	T	T	T	T
Self management	U		U	T (M Ex)
Computer skills	U	U	U	T (M Ex)
Questioning	U	U	U	T
Note taking and making	U	T		T
Working in groups	U	U	U	T
Reading	U	T (M Ex)	U	U
Writing	U	T	U	U
Listening	U	T	U	U
Speaking	U	T	U	U
Writing Paragraphs	U	T	U	U
Report writing	U		T (M Ex)	
Essay writing			T	U
Referencing	U		T	U
Plagiarism	U		T	U
Problem solving	T			

U = utilised; T = explicitly taught; M Ex = Mathematics examples used

Elements of the other courses used in the Mathematics Communication course

Some of the skills students need to become effective university learners include questioning, study management, note taking, computer skills, reading and writing, referencing and report writing. All of these skills are explicitly taught in the other three courses and then applied in the Mathematics Communication (MC) course.

Questioning

In *Studying at University* (SAU), students are taught about precision questioning (Matthies, 1991 — Figure 1), as many international students lack both the confidence and ability to question their teachers and in fact many feel questioning is inappropriate as this may suggest an inability of the teacher to

explain a concept clearly rather than their own level of grasping the explanation (Mangubhai, 1997). Precision questioning can be used orally in tutorials, but is also recommended in the students' analysis of assignment and task questions through self-talk. In MC this is utilised at the beginning of every session in conjunction with typical problem solving heuristics.

Seven Basic Categories	The 'go-no' question	Questions that clarify or build meaning	Questions about assumptions	The basic critical question	Questions about clauses	Questions about consequences	Questions about action
A generic utility version of the question	Why spend time on this	What do you mean?	What are we assuming	How do we know this is true?	Why? What was the cause of this?	What will be the effects?	What should be done?

Figure 1: Matthies' seven basic categories of questions

For example, at the beginning of every problem solving session the 'go-no go' category of question is appropriate. A student could ask at the beginning of the problem solving session on *How to make Jellied Snakes*, 'Why would a student want to know how many jellied snakes can be produced by a confectionary company in a day?'

The 'basic critical question', e.g. 'what evidence is … based on', becomes important when looking at data or referencing in assignments and international students who do not have exposure to such style, need to understand the importance of evidence and the principles of acknowledging sources.

Self-management

In SAU students construct weekly schedules and assessment timetables. This is then referred to and used in MC as students complete assessment tasks. As students are expected to self-pace through the mathematics skills section, this becomes important and students in the past have deliberately constructed timetables with a heavier mathematics load at the beginning of the semester to finish the mathematics skills tests early. This ensures the much-needed assignment preparation time required to complete assignment tasks towards the latter part of the program.

Note-taking

Note-taking techniques from lectures are developed in the SAU course. Students practise this not only in the various problem-solving sessions but also during student presentations (see next section) where nominated students present a mathematics problem. Here other students are expected to take notes and then summarise their notes. An example of how students could take notes is shown in Figure 2.

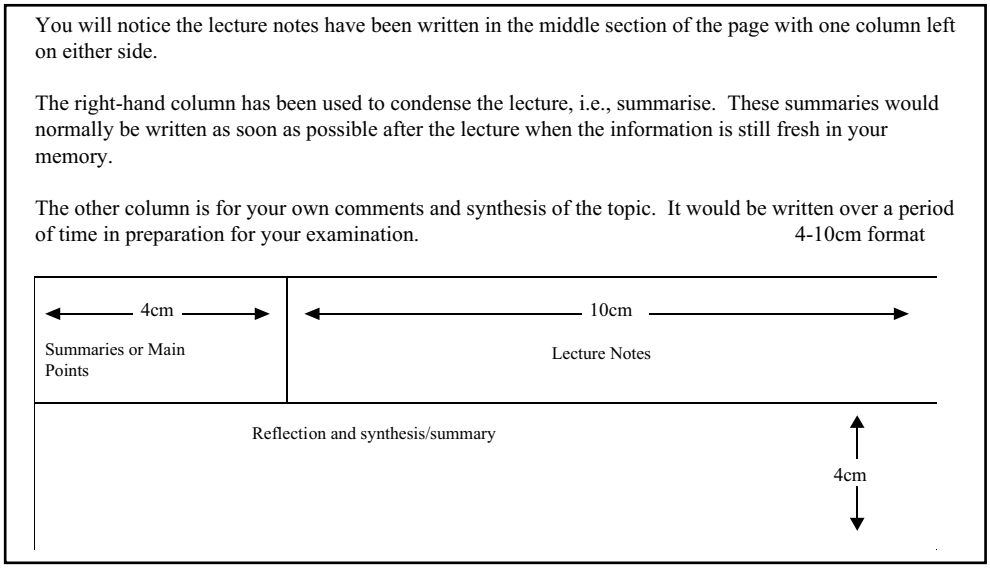

Figure 2. Example of how to take notes — excerpt from SAU

Computing skills

In SAU students learn how to use a computer for such things as word processing, spreadsheets and *Powerpoint* presentations. In MC, students are expected to present assignments two and three professionally. In assignment three, students should present graphs developed from a spreadsheet, and are expected to refer to it correctly and write a paragraph clearly linking it to the assignment.

Writing

In *English for Academic Purposes* (EAP), it is assumed the paragraph is the basic unit of academic writing. The process of paragraph writing is developed in EAP (Figure 3), and then each week an objective of the MC course is to practise writing skills in specific writing sessions. For example in a topic on making jellied snakes for the 'Tooth-Rot Sweets Company' students are divided into groups who then look at the sections of the production process (ingredients, packaging, machinery, costing). In the writing session, each group must produce a summary of their findings.

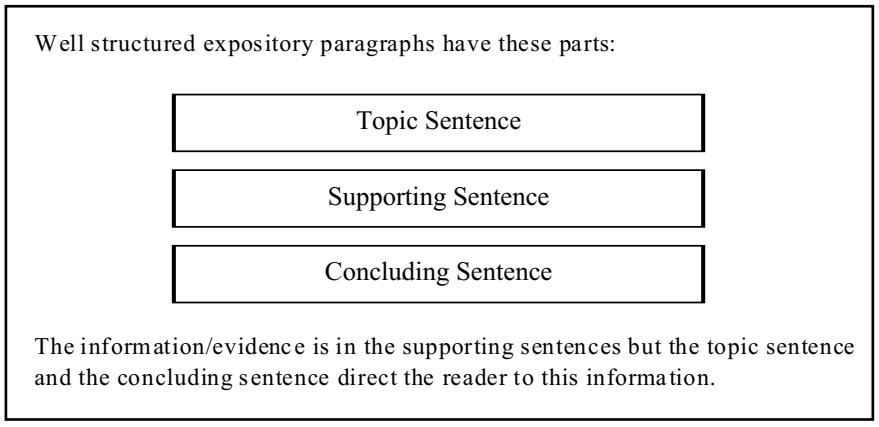

Figure 3. Excerpt from EAP writing

Reading

An efficient reading model (ERM) is developed in EAP (Figure 4). As the reading of articles is an important part of MC, the ERM is utilised in MC. For example in a problem solving session on density, students are first asked to read an article about a granny who can float (Figure 5). The ERM model is used by the students to gain an overall view of the reading and to assess for themselves if they have enough information to complete the next part of the problem solving activity.

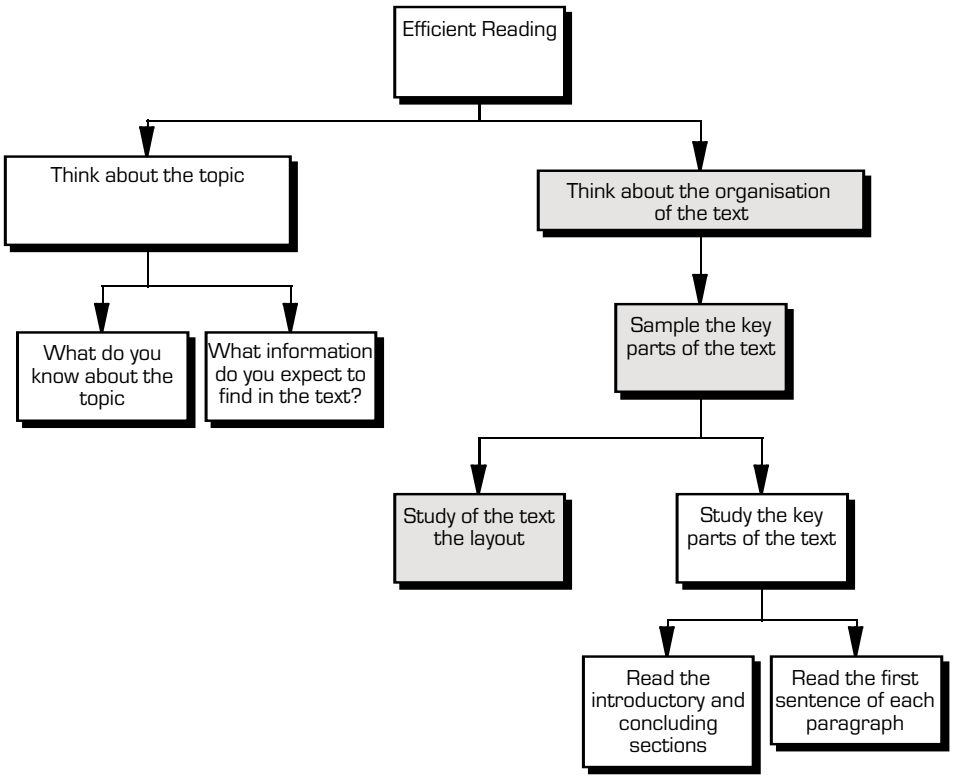

Figure 4. Efficient reading model: An overview, from EAP.

The unsinkable granny

…

"Every time my mama sat me on the bottom, I'd just bounce up to the surface again. They were very puzzled. Nobody else in our family ever floated. I really can't explain it."

Neither can Dr Walter Wood, a senior lecturer in anatomy at the University of Queensland.

"Her body must be less dense that water," he told The Weekly hesitantly." Or, since she's not carrying a lot of fat, her bones may be light… or something…"

Figure 5. Excerpt from student problem-solving activity.

Referencing

In *Communication Processes* (CP) students learn about in-context referencing and reference lists and use these in two of the mathematics assignments. It is expected that students utilise not only the book of reading provided, but also other print and electronic references from the library and appropriate academic databases. Students have four one-hour sessions on the library and Internet skills in SAU.

The MC course incorporates many of the skills taught in the three other courses and assists the students to use these skills in MC. By practising these skills in UNIPREP, it is hoped the students will then go on using them in their degree. For the MC teacher, the challenge is to have an intimate knowledge and underlying understanding of student learning and second language learning and ESL teaching in order to incorporate the skills and actively use them in the MC course.

Elements of the Mathematics Communication course used in other courses

Teachers in the other three courses know about the content and approach of the *Mathematics Communication* course. They are aware of the particular vocabulary of mathematics, the paragraph writing practised in the problem solving sessions and the assignments expected of the students. These aspects are specifically addressed in other courses.

Vocabulary and grammar

Students use a glossary notebook to record vocabulary items in context from all courses. Variations of these sentence structure patterns composed by students are a further step in continual vocabulary building. Students are urged to include mathematics vocabulary, with examples. The CP teacher assesses and encourages regular 'glossary' practices. For example, in MC we have discussions on compare statements and students are asked to compare results by subtraction or multiplication. For example, students may write, 'My estimate was five dollars higher than the actual result,' or 'My estimate was twice as much as the actual result,' or the teacher could discuss the change in syntax to 'There was a five dollar difference between…' and discuss the subsequent semantic difference.

Reflection on learning

In SAU students refer at times to the *Mathematics Communication* course (Figure 6) and use a learning log to reflect on different aspects of their courses. At times students are expected to refer to the *Mathematics Communication* course with such questions/reflections as:

- What are you coping well with in adapting to Australian and university life? Why? What are you having difficulty coping with? Why? How might you overcome these difficulties?
- Submit a three-week revision timetable for all courses of the UNIPREP program.

Activity 4.4

For this activity you may like to work in pairs or a small group of 3 or 4. Look at the first module of your ***Mathematics Communication*** unit. What activities do you need to do to learn effectively in this module? List them below and describe them in your own words. The first has been done for you.

Mathematics Communication

Activity	**Description of type of activity**

Figure 6. Excerpt from SAU booklet

Reading

In MC students are expected to read articles for assignments. In EAP this becomes part of summative assessment. Figure 7 shows a part of this assessment from an alcohol assignment where students read a text called the mathematics of alcohol (Deakin, 1987). One of the difficulties students have is realising that mathematics is not always exact. In the example students are expected to estimate their blood alcohol concentration (BAC), and an article written about this emphasises the many variables involved (see Question 3 in Figure 7). For example, students must realise an estimated time when a drinker will have a BAC of zero would not be 6.216 hours.

Stage 1 Part A Key Vocabulary and Formula **15 marks**

Question 1

Define the following terms (develop full 'academic' definitions using the text only)

(a) Blood alcohol concentration

(b) Reduced weight

(c) Absorption time

(d) Processing rate

(e) Legal limit

(10 marks)

Question 2.
Write the formula for converting millilitres of alcohol into BAC equivalent

(2 marks)

Question 3.
The text emphasises that when people calculate their BAC, the result is not based on precise, highly accurate data. A large number of words and phrases in the text remind the listener/reader of this.

Underline 15 of these expressions in the copy of the text provided

(3 marks)

Stage 1 Part B Text Structure **10 marks**

Question 1
'The mathematics of alcohol is an analytical expository text so it consists of three basic sections: Introduction
Information/Evidence (body)
Conclusion

(a) Mark the sections using a line down the left side of the columns of text

(b) Label each section clearly

(3 marks)

Figure 7. EAP assessment item.

While teachers in the other courses are not expected to teach a lot of academic numeracy, they are expected to have an awareness of the numeracy needs of their students. This includes some arithmetic work (such as looking at assessment percentages, etc.), expressing statements involving numbers correctly (such as you are three times as likely to have an accident…), and how to approach studying mathematics effectively. If the teachers of these courses value the role of academic numeracy and highlight its importance, then the student will also see that academic numeracy is more than just the mathematics they learned at school.

Assessment

Three assignments (25% of total assessment) in MC involve important aspects of skill integration and each one highlight skills explicitly taught in one of the other courses and applied in the assignments for the courses. The three assignments involve mathematics but are not dominated by it. The first is a series of mathematics problems with one solved and presented orally by each student. These utilise the skills developed from the speaking section of EAP, but whose content is a mathematics-based problem-solving activity. In the second assignment students are asked to write a report which is jointly marked in *Communication Processes* (CP) and *Mathematics Communication* (MC). Report writing skills are explicitly taught and developed in CP and this process is then utilised in this assignment. The third assignment is a group assignment which develops students' report writing skills further and utilises the group speaking sessions in *English for Academic Purposes* (EAP) to present a group report and field questions.

Moreover, in all courses there is the specific development of negotiation skills and note taking skills as components of small group class work and these are reflected in the outcomes of group projects and presentations.

Individual student problem

Each student chooses one problem (see example in Figure 8), develops a solution and presents it to the class. The student must use techniques of oral presentations developed in EAP and, in the example below, have the skills developed from the computing section of the program (in *Studying at University*). For example, students must introduce the topic, provide a conclusion and be prepared to field questions. In addition, the class must practise the skills of note taking from a spoken text developed in EAP and practise precision questioning developed in SAU (Figure 1). If students have the skills they may use a power point presentation. As the students are presenting these problems over the length of the program, the MC teacher's knowledge of the skills taught in EAP enables the teacher to remind students of these skills (Figure 9). By the end of the course, students' oral presentation skills have improved noticeably especially in the structure taught in EAP.

Session 12: Students Problem

The following is the assessment for a course ANC2100 at university:

	Due Date	% weighting
Assignment 1	10 August	20
Assignment 2	12 September	20
Assignment 3	10 October	20
Examination	November	40

Other requirements: Students need at least 55% to gain a pass for this course.

A student gained the following marks in the assignments:

Assignment	Possible marks	Total available
Assignment 1	17	25
Assignment 1	75%	
Assignment 3 (part a)	7	10
Assignment 3 (part b)	8	20
Assignment 3 (part c)	9	10

The parts of assignment 3 have equal weighting.

(a) What is the minimum examination mark a student needs to achieve a pass?
(b) Create an excel spreadsheet to calculate the total percent.

See Lesson 3 in the computing course for help with spreadsheets.

Figure 8. Example of student problem.

Making Oral Presentations — A Summary

Step 1: Prepare Material for a talk

- Select a few points only to discuss in your presentation.
- Research the topic well by reading and from personal experience.
- Cite well-known writers to give your argument credibility.

Step 2: Structure Your Points

- As your planning an essay you should plan the order of speaking your points.
- Organise the talk into sections: introduction, development of the main points, summary and conclusion. Work within these general headings.

Step 3: Establish and Maintain Rapport with Your Audience

- Use a device or another means of attracting attention to the main point such as
  (1) wearing a hat if you are planning to talk about exposure to the sun,
  (2) carrying a 'walkman's' radio if you are discussing spectator sport.
- Keep eye contact with individuals during the talk if that is possible.
- Use non-verbal communication signals to gain interest.
- Be sincere, keen to give the information.

Step 4: Listen to Yourself for Fluency

- Be relaxed from the start; take a deep breath.
- Speak naturally
- Let language flow smoothly.
- Vary pitch, volume, pace, pause, and stress to help emphasise your points.
- Be decisive when it is important, and more informal at other times.

Figure 9. Summary of making oral presentations (from EAP).

Smoking assignment

In CP, students develop the skills of report writing required in faculties. While the report style differs from faculty to faculty, many of the components are similar, and students in UNIPREP follow the style suited to business. In the

Mathematics Communication problem solving classes, students undertake mathematical tasks such as: interpreting trend graphs and scatter plots in the context of smoking; calculating amount of tar, nicotine and carbon monoxide in various brands of cigarettes; and spending time writing about these tasks. These tasks are then utilised in the assignment (Figure 10). The assignment is marked by the *Mathematics Communication* lecturer using marking criteria which assesses things such as creating and commenting on graphs correctly. The CP lecturer then corrects the assignment using different marking criteria such as correct reporting format, referencing and suitable English expression. While the student appreciates having one assignment for two courses, the approach highlights the use of the learning in CP as it applies to an assignment presented in MC. It also facilitates the dialogue between the CP and MC teacher in terms of numeracy and literacy aspects of their courses.

Assignment 2: Smoking Due Date: End of Session 9

In recent years, research has contributed to increased understanding of the effects of smoking on health.

The Director of Student Support at the University is concerned that, in spite of this research, students are continuing to smoke, and young people, in particular, are taking up smoking.

The Director has requested you to write a report which will provide the following:
1. Information about the health risks associated with smoking, and
2. recommendations about the most effective way to educate students about these risks.

Figure 10. Excerpt from student smoking assignment.

Stock market assignment

Assignment 3 (see Figure 11) further develops students' report writing, numeracy, computing and oral skills and introduces them to group reports. Students are expected to share workloads with different tasks such as writing the introduction, conclusions, executive summary and overall template. The assignment includes presenting information graphically which involves use of software such as *Excel*. Feedback from the previous assignment helps to further develop report writing skills. Before final submission, students present a group oral, using standard oral presentation procedures learned from EAP including fielding questions and introducing speakers.

Assignment 3: Stock Market Due Date: End of Week 11

1.Group Work
Imagine your group is an investment advisory group. A client wants to invest $50 000 in the stockmarket. Following the rules of the Stockmarket game in Session 2, invest the money and follow the portfolio over 9 weeks. At the end of 9 weeks your group is to present a report of the investments to your client and provide recommendations. In week 11..each group will present an oral report…before submitting the final written report. The report is to have the following…

Figure 11. Excerpt from student group assignment on the stock market.

In this report, due in week 11 of the 13 week course, students should demonstrate many of the skill integration and transfer aspects that the development team incorporated into the course. The results of the assessment suggest that this does happen: not only do the students easily move into a report style format, but they also ask about the particular referencing difficulties of this report and suggest ways of presenting the oral report in the group style practiced in EAP.

The assignments provide evidence that students are transferring skills from one course to another. The assignments also show development of these skills. In the beginning their oral skills are restricted to talking in front of a class. They then develop a framework for giving oral presentations both individually and in a group. Students' report writing skills develop first in CP, then students use the skills in one assignment while still learning the skills, and then re-use them again in a second assignment once feedback is given from the first assignment. At the same time referencing skills are learned and practised and plagiarism issues are raised and explained.

Conclusion

Many international students struggle with the disadvantage of limited language proficiency, especially the more difficult academic language required of universities including 'the more abstract, formal, contextually reduced language of the texts, lectures, or discussions' (Crandall, 1987). They also have to cope with cultural differences both within the university and outside it. Preparatory programs need to bridge the gap as efficiently as possible. This article has outlined one possible method from the perspective of mathematics. Not only can mathematics provide rich language tasks and other more general academic communications skills, but also other courses can integrate mathematics into their curriculum. By providing such an integrated program, students are alerted to many interrelated skills and they transfer skills learned in one course to another. Whether these skills are utilised in their further degree studies has yet to be proved, but anecdotal evidence and evaluative comments from tutors in an academic learning support unit suggests these UNIPREP students demonstrate an ability to write reports, and have better oral skills than other international students who do not undertake the program. Moreover their approach to assignments, question analysis and logical presentation allow academic support to progress smoothly, as these students demonstrate a metacompetence in understanding the academic language and approach to assignments. They may not be proficient in the language, but at least they can concentrate on building academic language proficiency in a more familiar academic culture.

References

Australian Council for Educational Research (ACER) (2003). *Graduate Skills Assessment Test.* Retrieved 1 October 2003 from http://www.acer.edu.au/unitest/gsa/documents/GSA_2003_Sample_Questions.pdf

Ballard, B. & Clanchy, J. (1991). *Teaching Students from Overseas: A Brief Guide for Lecturers and Supervisors.* Melbourne: Longman Cheshire.

Crandall, J. A. E. (1987). *ESL through Content-Area Instruction.* Englewood Cliffs, NJ: Prentice-Hall Regents.

Cuevas, G. (1984). Mathematics learning in English as a second language. *Journal for Research in Mathematics Education, 15*, 134–144.

Dale, T., & Cuevas, G. (1987). Integrating language and mathematics learning. In J. A. Crandall (Ed.), *ESL through Content Area Instruction: Mathematics Science and Social Studies Language in Education: Theory and Practice No. 19.* New York: Prentice Hall.

Deakin, M. (1987). The Mathematics of Alcohol, *Ockam's Razor.* ABC.

Evans, J. (1999). Building bridges: Reflections on the problem of transfer of learning mathematics. *Educational Studies in Mathematics, 39*, 23–44.

Flemming, D. (1998). The concept of meta-competence. *Competence and Assessment, 16*, 9–12.

Galligan, L. (1992). *Developing communication skills in mathematics using problem solving, group work and individualised learning.* Paper presented at the Asian perspectives in mathematics, University of Western Sydney.

Hubbard, R. (1994). Addressing the language and cultural problems of overseas students in the context of mathematics classes. *Higher Education Research and Development, 13*(2), 133–142.

Kemp, M. (1995). Numeracy across the tertiary curriculum. *International Commission on Mathematics Instruction Conference on Regional Collaboration*, 375–382.

Kessler, C. (1987, April 21-27). *Linking Mathematics and second language teaching.* Paper presented at the 21st Annual Convention of Teachers of English to Speakers of Other Languages, Miami Beach, Florida.

Lang, C. (2002). Addressing the transition needs of coursework post-graduate students. *6th Pacific Rim, First Year in Higher Education Conference Proceedings.* Accessed http://www.qut.edu.au/talss/fye/abstracts02/LangAbstract.htm.

Mangubhai, F. (1997). Primary socialisation and cultural factors in second language learning: Wending our way through semi-charted territory. *Australian Review of Applied Linguistics, Series S, Number 12*, 23–54.

Matthies, D. (1991). *Working Smarter through Precision Questioning.* Stanford California: MindWorks.

Robertson, M., Line, M., Jones, S. & Thomas, S. (2000). International students, learning environments and perceptions: A case study using Delphi technique. *Higher Education Research and Development, 19*(1), 89–102.

Stephens, M., Waywood, A., Clarke, D. & Izard, J. (Eds) (1993). *Communicating Mathematics: Perspectives from Classroom Practice and Current Research.* Hawthorn, Victoria: Australian Council for Educational Research Ltd.

Taylor, J., Galligan, L. & Van Vuuren, P. (1998). *Perceived Mathematical Proficiencies required for First Year Study at the University of Southern Queensland.* Toowoomba: University of Southern Queensland.